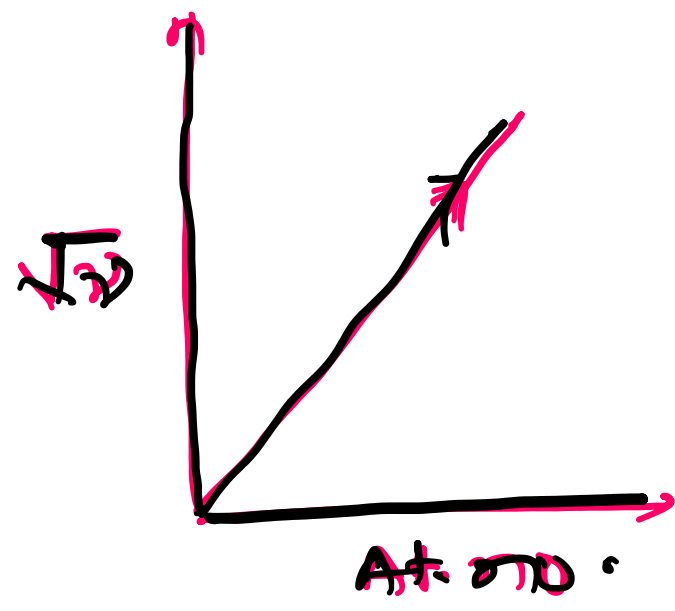


MODERN PERIODIC LAW and THE PRESENT FORM OF

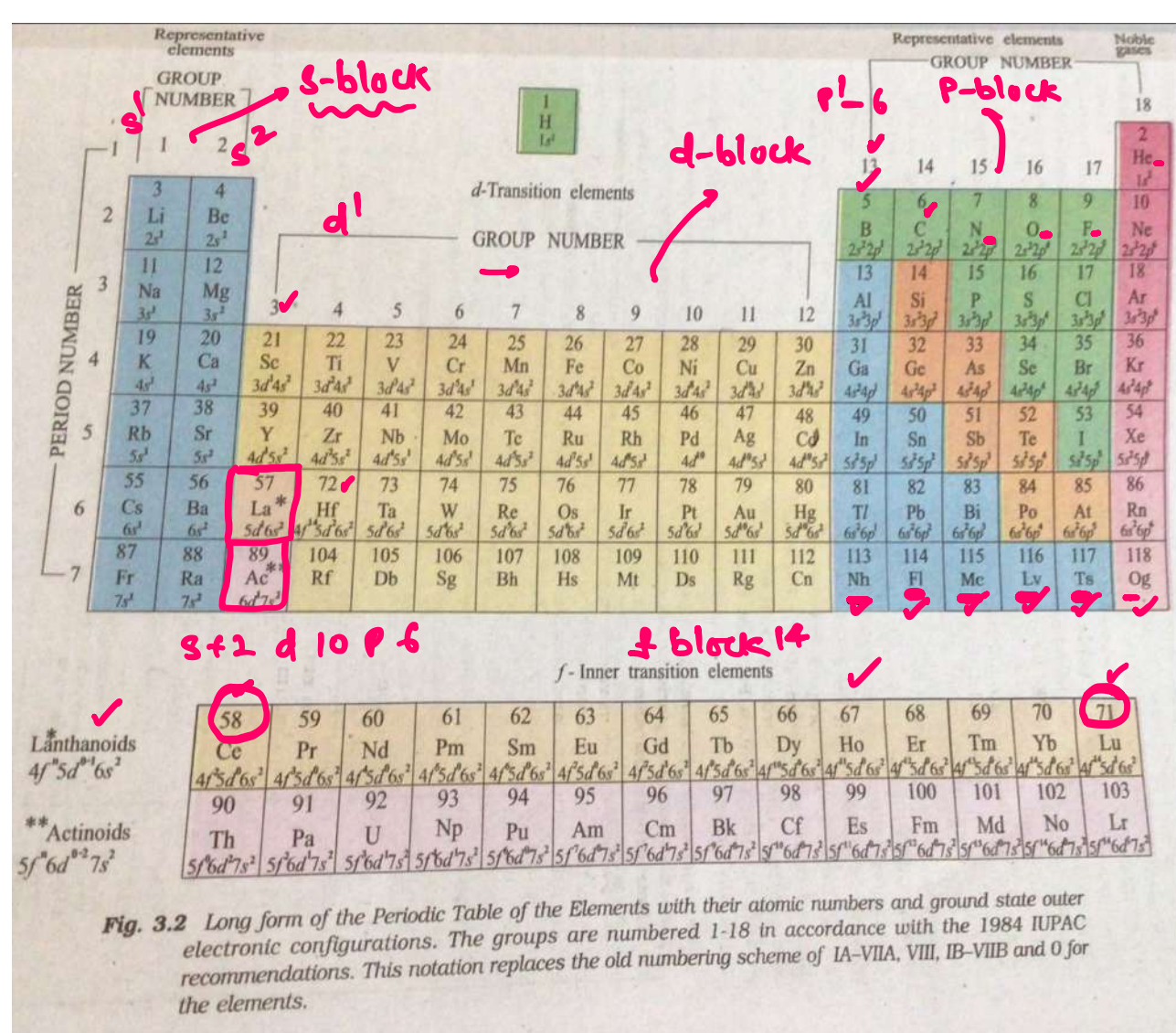
PERIODIC TABLE

- * In 1913, Henry Moseley observed regularities in the characteristic X-ray spectra of the elements. A plot of $\sqrt{\nu}$ (ν is frequency of π -ray emitted) against atomic number (z) gave a straight line and not the plot of $\sqrt{\nu}$ v/s atomic mass.
- * He thereby showed that the atomic number is a more fundamental property of an element than its atomic mass.
- * Mendeleev's periodic law was, therefore, accordingly modified. This is known as Modern Periodic Law and can be stated as:
 - * Physical and chemical properties of the elements are periodic functions of their atomic numbers.



- * It is now recognized that the Periodic law is essentially the consequence of the periodic variation in electronic configurations, which indeed determine the physical and chemical properties of elements and their compounds.

- * A modern version so called "Long form" of the periodic table of the elements, is the most convenient and widely used.
 - The Horizontal rows $\rightarrow$ periods
 - The vertical columns $\rightarrow$ groups or families
- * According to IUPAC groups are numbered from 1-18



1st
Li $\rightarrow$ Lithium
Na $\rightarrow$ Sodium
K $\rightarrow$ Potassium
Rb $\rightarrow$ Rubidium
Cs $\rightarrow$ Cesium
Fr $\rightarrow$ Francium

2nd
Be
Mg
Ca
Sr
Ba
Ra

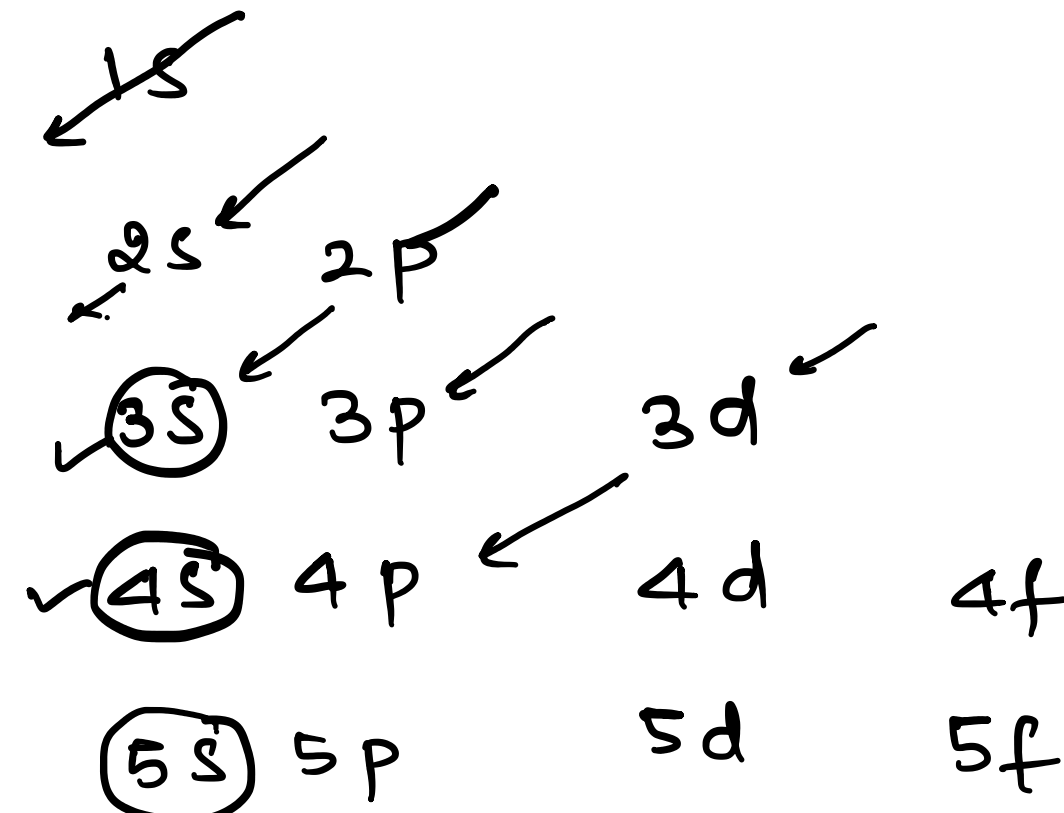
Alkali metals

Alkaline earth metal

At. no = 11 $\Rightarrow$ Na

$$1s^2 2s^2 2p^6 3s^1 \Rightarrow \textcircled{3} \Rightarrow \text{Period}$$

$\uparrow$
11th $\Rightarrow$ s-subshell
 $\downarrow$
(Block) $\Rightarrow$ s-block.



$1s^1 1s^2 \rightarrow$ 1st period $\Rightarrow$ 2 Elements

$2s^2 2p^6 \rightarrow$ 2nd period $\Rightarrow$ 8 ele.

$3s^2 3p^6 \rightarrow$ 3rd period $\Rightarrow$ 8 Elements

$4s^2 3d^{10} 4p^6 \rightarrow \textcircled{5}$

Nomenclature of elements with Atomic number >100

- * The naming of the new element had been traditionally the privilege of the discoverer and the suggested name was rectified by IUPAC.
- * Both American and soviet scientists claimed credit for discovering element 104. The Americans named it Rutherfordium where as Soviets named it Kurchatovium.
- * To avoid such problems, the IUPAC has made recommendation that until a new element's discovery is proved, and its name is officially recognised, a systematic nomenclature be derived directly from the atomic number of the element using the numerical roots for 0 and number 1-9. The roots are put together in order of digits which make up the atomic number and "ium" is added at the end. The IUPAC names for elements with Z above 100 are shown in below table...

Digit	Name	Abbreviation
0	<u>nil</u>	<u>n</u>
1	<u>un</u>	<u>u</u>
2	<u>bi</u>	<u>b</u>
3	<u>tri</u>	<u>t</u>
4	<u>quad</u>	<u>q</u>
5	<u>pent</u>	<u>p</u>
6	<u>hex</u>	<u>h</u>
7	<u>sept</u>	<u>s</u>
8	<u>oct</u>	<u>o</u>
9	<u>enn</u>	<u>e</u>

Atomic Number	Name according to IUPAC nomenclature	Symbol	IUPAC Official Name	IUPAC Symbol
101	Ununilium	Uun	Mendelevium	Md
102	Unbibium	Uub	Nobelium	No
103	Untrium	Uut	Lawrencium	Lr
104	Unquadium	Uuq	Rutherfordium	Rf
105	Unpentium	Uup	Dubnium	Db
106	Unhexium	Uuh	Seaborgium	Sg
107	Unseptium	Uus	Bohrium	Bh
108	Unoctium	Uuo	Hassium	Hs
109	Unennium	Uue	Mitnerium	Mt
110	Ununnilium	Uun	Darmstadtium	Ds
111	Unununium	Uuu	Rontgenium	Rg
112	Ununbium	Uub	Copernicium	Cn
113	Ununtrium	Uut	Nihonium	Nh
114	Ununquadium	Uuq	Flerovium	Fl
115	Ununpentium	Uup	Moscovium	Mc
116	Ununhexium	Uuh	Livermorium	Lv
117	Ununseptium	Uus	Tennesine	Ts
118	Ununoctium	Uuo	Oganesson	Og

- * Thus, the new element first gets a temporary names with symbol consisting of three letters. Later permanent name and symbol are given by a vote of IUPAC representatives from each country. The permanent name might reflect the country (or state) of the country in which element was discovered, or pay tribute to a notable scientist.

- * As of now, elements with atomic number up to 118 have been discovered. Official names of all elements have been announced by IUPAC.

last

$$\begin{array}{l} 1 \rightarrow 1 \Rightarrow 1s^1 \\ 2 \rightarrow 2 \Rightarrow 2s^1 \\ 3 \rightarrow 3 \Rightarrow 3s^1 \\ 4 \rightarrow 4 \Rightarrow 4s^1 \\ 5 \rightarrow 5 \Rightarrow 5s^1 \\ 6 \rightarrow 6 \Rightarrow 6s^1 \\ 7 \rightarrow 7 \Rightarrow 7s^1 \end{array}$$

Alkali

Be $\rightarrow$ 2nd
Mg $\rightarrow$ 3rd
Ca $\rightarrow$ 4th
Sr $\rightarrow$ 5th
Ba $\rightarrow$ 6th
Ra $\rightarrow$ 7th

117 Uus